REMARKS

This Amendment serves as the submission accompanying Applicants' Request for Continued Examination (RCE) filed pursuant to 37 C.F.R. §1.114. By final Office Action mailed December 4, 2002, pending claims 1-6 stood rejected, reconsideration of which is respectfully requested in view of the above amendments and the following remarks. Claims 1-6 are now pending. Claim 1 has been amended.

Rejection Under 35 U.S.C. § 112, Second Paragraph

Claims 1-6 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite due to the use of the term "finely divided," for the reasons set forth on pages 2-3 of the final Office Action. Applicants respectfully traverse this ground of rejection and submit that, in light of the specification, the scope of this term would be clear to one of ordinary skill in the art for the following reasons.

In order to apply an agrochemical, such as a pesticide, to, for example, a leaf, it is necessary to apply the pesticide in a form which can either be taken up by the plant or reside evenly distributed on a surface so as to enable ingestion by pests or be taken up by organisms such as fungi. The ideal particle size under most circumstances is that of a discrete molecule, *i.e.*, the agrochemical is applied as a solution, generally an aqueous solution. However, not all agrochemicals are water soluble and water insoluble agrochemicals must be applied as a dispersion of particles.

Ultimately, a suitable particle size for an agrochemical dispersion is determined by the need for efficacy, for example, such that the agrochemical is absorbed by the plant or ingested by pests, and dispersion stability (although density of the particle will also have an effect). The particle size required for efficacy is generally less than 100 μm. Dispersion (or suspension) of solid particles is subject to two main forces. One is gravity, the other is Brownian motion, the random collision of particles due to heat, which tend to keep the particles suspended. As a general rule, the particle size at which Brownian motion forces overcome gravity is around 1-5 μm. As described in the specification at page 19, lines 17-19 and page 20, line 6-8, an acceptable temporary stable dispersion can be achieved with a particle size in the range of 5-15

μm. Such a dispersion will be stable for around 1-2 hours, which is acceptable for agricultural spraying of formulations where the dispersion is formed in water immediately prior to spraying.

Applicants submit that these, and related, size ranges are ones which would be appreciated and well understood by one of ordinary skill in the art. In support of this position, enclosed are relevant pages from three general references, namely, Tharwat F. Tadros, *Surfactants in Agrochemicals* (Marcel Dekker, Inc.); Earl K. Fischer, *Colloidal Dispersions* (John Wiley & Sons Inc.); and R.D. Nelson, *Dispersing Powders in Liquids* in Handbook of Powder Technology, Vol. 7, 1995. Tadros describes the formulation of suspension concentrates (SC), which is sold as a solid dispersed in liquid, and refers at page 4 to a general particle size of 0.1-5 μm. The excerpt from Fischer, at pages 35-36, refers to a particle size range of 0.5-100 μm, with particles in the size range of 5-50 μm having a settling time of up to 2 hours, for use in temporary dispersions suitable for formulation immediately prior to spraying, such as a wettable powder (WP) or a water dispersible granule (WG). Accordingly, having regard to the type of formulation (SC, WP or WG) required, one of ordinary skill in the art would recognize what "finely divided" refers to with respect to particle size.

The Examiner further contends that the term "granule" (as in WG) is not normally understood as being consistent with "fine" or "finely." However, Applicants submit that one of ordinary skill in the art would recognize that a water dispersible granule is a weakly bound agglomeration of particles, which, when added to water, forms a dispersion of those particles. Thus, it is not the granule *per se* which is suspended but the particles which make up the granule, and while the granule itself may be large, the resulting dispersion consists of finely divided particles. Furthermore, Applicants note that the function of the dispersant is to stabilize the resulting dispersion of finely divided particles, not to form such a dispersion from a larger granule.

Accordingly, in view of the above arguments, Applicants respectfully submit that the pending claims satisfy the second paragraph requirements of §112, namely that the term "finely divided" would not be indefinite to one of ordinary skill in the art, and request that this ground of rejection be withdrawn.

Rejection of Claims 1-6 Under 35 U.S.C. § 102(b)

Claims 1-6 remain rejected under 35 U.S.C. § 102(b) as anticipated by Kataoka at al. (JP 58131903), Kataoka et al. (JP 02111703) and Nabeya et al. (JP 06009302). Applicants respectfully traverse this ground of rejection for the following reasons.

Although neither Kataoka reference nor Nabeya discloses that the copolymers taught therein, such as styrene/maleic anhydride, are alternating, the Examiner asserts that such copolymers would inherently be alternating due to the reactivity of the electron donating monomers in combination with the reactivity of the electron accepting monomers. In support of this assertion the Examiner refers to U.S. Patent No. 3,864,319 at column 1, lines 15-29.

Applicants respectfully disagree and, as set forth in Applicants' previous Amendment, mailed October 15, 2002, submit that different sets of polymerization conditions produce copolymers of differing ratios and structures. In the absence of any specific teaching as to the appropriate conditions, Applicants submit that it can not accurately be assumed that the polymers referred to in the cited references are the result of the particular set of conditions which would produce an alternating copolymer. In this regard, enclosed is an English translation of Kataoka et al. (JP 58131903), brought to Applicants' attention during the prosecution of a related application (namely, U.S. Application No. 09/529,495), which describes the preparation of the disclosed styrene/maleic anhydride copolymer at temperatures in the range of 150-180°C (at page 6). As set forth in the excerpt from J.M.G. Cowie, *Alternating Copolymers* (submitted with Applicants' previous Amendment, mailed October 15, 2002), when maleic anhydride is copolymerized with styrene, an alternating copolymer is only obtained when polymerizing temperatures are <80°C. At elevated temperatures of >90°C, the copolymerization becomes increasingly random (see page 3 of Cowie). Thus, the styrene/maleic anhydride copolymer disclosed in Kataoka et al. (JP 58131903) is expected to be a random copolymer, not an alternating copolymer as asserted by the Examiner.

Furthermore, to Applicants' knowledge, neither Kataoka et al. (JP 02111703) nor Nabeya contain any disclosure regarding the specific conditions under which the disclosed copolymers were produced. Accordingly, Applicants respectfully submit that none of the cited

references disclose every element of pending claim 1, namely that the disclosed copolymer dispersants are alternating, and request that this ground of rejection be withdrawn.

Furthermore, Applicants note that at pages 4-5 of the final Office Action, mailed December 4, 2002, the Examiner seems to suggest that even if a styrene/maleic anhydride copolymer has a 3:1 ratio of styrene to maleic anhydride, such a copolymer would still be considered "alternating." Applicants respectfully disagree with this suggestion and submit that if a copolymer has 3 styrene residues for every maleic anhydride residue, then many of the styrene residues will be linked to other styrene residues and the copolymer can not be considered "alternating." Rather, Applicants have found that a copolymer with a 3:1 ratio of styrene to maleic anhydride does not function effectively as a dispersant (see Example 7 in Table 1) and, therefore, a copolymer with a 3:1 ratio of styrene to maleic anhydride is not an alternating copolymer as per the present invention.

As a final matter, in order to advance prosecution of this application, and at the suggestion of the Examiner, the proviso of claim 1 has been amended to further exclude a copolymer of isobutylene and maleic anhydride.

Rejection of Claims 1-3, 5 and 6 Under 35 U.S.C. § 102(b)

Claims 1-3, 5 and 6 remain rejected under 35 U.S.C. § 102(b) as anticipated by Narayanan et al. (U.S. Patent No. 5,476,662). Applicants respectfully traverse this ground of rejection for the following reasons.

A distinguishing feature of the present invention is that it relates to a dispersion of finely divided solid material (*i.e.*, a suspension), rather than the emulsions disclosed by Narayanan. Narayanan discloses combining a liquid (or low melting point solid) pesticide or herbicide with a copolymer to form a solid complex of the copolymer and captured agrochemical for purposes related to easier storage and handling of the agrochemical. Narayanan further discloses dispersing the described complex in water as a stable emulsion.

In general, an emulsion is a stable mixture of two or more immiscible liquids (although, as discussed below, solid emulsions are also possible). Applicants submit that one of ordinary skill in the art would appreciate that, at the molecular level, the process of dispersing a water immiscible liquid in water to form an emulsion is fundamentally different than dispersing a

water insoluble solid in water. In an emulsion, the stabilizing surfactant (the emulsifier) is absorbed into droplets of immiscible liquid and sits at the immiscible liquid/water interface. In this way, the emulsifier is partly dissolved in the liquid or low melting point solid being dispersed, or emulsified, and generally has both a hydrophobic and a hydrophilic portion. Therefore, the emulsifier need not be water soluble itself. In contrast, in a dispersion of a water insoluble solid in water, the stabilizing surfactant (the dispersant) is adsorbed onto the surface of the solid. In order to disperse the water insoluble solid, the dispersant must necessarily be water soluble (as recited in pending claim 1). In this way, the physiochemical requirements of an emulsifier are quite different than that of a solid particulate dispersant (*i.e.*, suspension stabilizer) and clearly the suitability of a particular copolymer for one purpose cannot be equated with a suitability for the other.

In Narayanan, reference to "low melting solids" applies to active ingredients which are commonly solid at ambient temperatures, but which can be readily liquefied and form an emulsion as per the process of Narayanan. Applicants submit that one of ordinary skill in the art would appreciate that, although the active ingredient may revert to a solid at room temperature, as described above, it still has emulsifier partly dissolved within it and is, strictly speaking, still an emulsion. The fact that the liquid active ingredient may become a solid upon cooling does not change the physical nature of it being an emulsion and such an emulsion would not be a dispersion as per the present invention.

Accordingly, Applicants respectfully submit that Narayanan does not disclose every element of pending claim 1, namely, a formulation comprising at least one active, finely divided, water-insoluble, solid agrochemical principal and at least one dispersant, and request that this ground of rejection be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claims 1-6 stand rejected under 35 U.S.C. § 103(a) as obvious over Robinson et al. (U.S. Patent No. 4,102,667). More specifically, the Examiner is of the opinion that Robinson teaches aqueous dispersion/suspensions prepared by suspending agrochemicals and an alternating copolymer of maleic acid/anhydride and a conjugated diene such as butadiene and/or isoprene. While the Examiner recognizes that Robinson does not recite a sequence of steps wherein the

agrochemical is combined with the alternating copolymer prior to their dispersion in water, the Examiner concludes that it would have been obvious to add the two components to the water simultaneously.

Applicants respectfully traverse this ground of rejection and submit that Robinson contains no teaching or suggestion that the disclosed alternating copolymer could be used as a dispersant for water insoluble agrochemicals. As set forth in Applicant's previous Amendment, mailed October 15, 2002, Robinson discloses a method to control drift of spray-applied aqueous solutions wherein a drift reducing additive (such as an alternating copolymer of maleic acid and a conjugated diene) is added to an already prepared aqueous spray composition (*i.e.*, an already dispersed agrochemical) to enhance the formation of large, stable droplets when the composition is sprayed. Robinson contains no disclosure regarding the further, or concurrent, use of such drift reducing additives as dispersants. To the contrary, the levels at which Robinson states that the copolymers can be used are either below or far in excess of levels which function as a dispersion stabilizer. Furthermore, Robinson discloses the addition of such drift reducing additives to aqueous compositions regardless of whether such compositions contain agrochemicals (*see* column 4, line 57 through column 5, line 23).

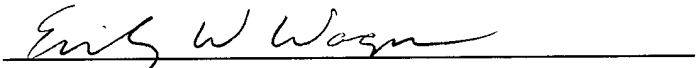
In view of the foregoing, Applicants respectfully submit that Robinson contains no teaching, suggestion or motivation to use the disclosed alternating copolymers as per the present invention – that is, as dispersants for water insoluble agrochemicals. Accordingly, Applicants submit that the cited reference fails to establish a *prima facie* case of obviousness against claims 1-6, and request that this ground of rejection be withdrawn.

In view of the above amendment and remarks, allowance of claims 1-6 is respectfully requested. A good faith effort has been made to place this application in condition for allowance. However, should any further issue require attention prior to allowance, the Examiner is requested to contact the undersigned at (206) 622-4900 to resolve the same. Furthermore, the Commissioner is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

Respectfully submitted,

Andrew Francis Kirby et al.

Seed Intellectual Property Law Group PLLC



Emily W. Wagner
Registration No. 50,922

701 Fifth Avenue, Suite 6300
Seattle, Washington 98104-7092
Phone: (206) 622-4900
Fax: (206) 682-6031

Enclosures:

Tharwat F. Tadros, *Surfactants in Agrochemicals* (Title page, pages 1-5)
Earl K. Fischer, *Colloidal Dispersions* (Title page, pages 34-37)
R.D. Nelson, *Dispersing Powders in Liquids* (Page 4)
English translation of Kataoka et al. (JP 58131903) Water-Decayable Granular Agricultural Chemical Composition (Title page, pages 1-11)

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